H. H. WINDSOR
FOUNDER

H. H. WINDSOR, JR.
EDITOR AND PUBLISHER

POPULAR MECHANICS
MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

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Radio Department

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I will be very glad to hear from you if I can be of further service.

Sincerely,

F. L. Boulton

RADIO EDITOR

FLB:JM

P. S. A complete list of simplified radio blueprints for students and experimenters is available upon request, from our Radio Department.

POPULAR MECHANICS MAGAZINE
RADIO BLUEPRINTS

The radio plans listed below include all of the well-known Popular Mechanics Magazine laboratory-tested circuits that have appeared in recent issues, and are available in blueprint form. When ordering, simply quote the numbers of the blueprints desired and enclose the proper amount. Address Popular Mechanics Magazine, Radio Department, 200 E. Ontario St., Chicago 11, Ill. These blueprints are priced at 25¢ each, postpaid. Back copies of the magazine can be obtained from our Book Dept. for 25¢ a copy. Back issues are not required for construction as blueprints are complete in every detail. Original material lists for these simplified radio construction articles are always available from our Radio Department, upon application, without charge. The student builder should have an original list of the parts specified to insure maximum results. Most of these radio units can be assembled from odds and ends of parts commonly found in the average student's, serviceman's and experimenter's junk boxes. In many cases the specifications are not critical and are subject to variations within reasonable limits.

If there are any points in these blueprints or material lists not clear to the builder, write to the Radio Editor, Popular Mechanics Magazine, 200 E. Ontario Street, Chicago 11, Illinois, for further information. There is no charge for this service.

R-313 Code-Practice Oscillator and Short-Wave Code Receiver for students. Two simple and efficient a.c.-d.c. "breadboard" units. A single 25A7-GT tube serves both units..Jan.-Mar. '43....25¢

R-312 1943 Little Giant T.R.F. Receiver. A practical wartime a.c.-d.c. broadcast band set for students, experimenters and beginners. Non-critical "junk box" parts; tubes: 12K7-GT; 12J7-GT; 70L7-GT .....Mar. 1943.....25¢

R-311 Two modern crystal receivers. One is a straight highly selective crystal set; the other employs a 70L7 tube as a.c.-d.c. amplifier.....Feb. 1943.....25¢

R-310 Four-watt a.c.-d.c. Phono Amplifier. For use with any record player; speaker is mounted in soft wood baffle. Non-critical "junk box" parts; tubes: 2- 25L6-GT; 1- 6C5-GT; 1- 25Z6-GT. .....Jan. 1943.....25¢

R-309 Four-Unit a.c.-d.c. student receiver. Four junk box units that plug together to make power unit, phono amplifier or 4-tube T.R.F. set. Tubes: 1- 25L6-GT; 1- 6J7-GT; 1- 6K7-GT; 1- 25Z6; 1- L-49-B ballast tube.....Nov. & Dec. '42.....25¢

R-308 Three-Tube "Special" All-Wave Super. This is No. 3 set in the student "V" series. Six hand-wound coils are used. Tubes: 2- 1Q5-GT; 1- 1A7-GT.....Oct. 1942.....25¢

R-307 Experimenters "Special" five-band "Twin" Two-Tuber. No. 2 in the student "V" series. Employs two type 1Q5-GT tubes; five hand-wound coils. A B-battery eliminator, that appeared in Aug. 43 issue, may be used.....Sept. 1942.....25¢

R-306 A.C.-D.C. Inter-Room Communicator System. A two-way hookup that includes a signal tone for calling. Non-critical specifications; tubes: 1- 45Z5-GT; 1- 12J7-GT; 1- 50L6-GT..Aug. '42.....25¢

R-305 Beginner's Special One-Tube Flashlight Battery Set. This is No. 1 in the series of "V" receivers for students and experimenters, each set is an entirely different unit. Most of the same parts are employed in "V" sets Nos. 2 and 3. Tube: 1- 1Q5-GT. .....July 1942.....25¢

R-304 Two-tube Economy T.R.F. receiver. The tubes are 1- 12B8-GT and 1- 32L7-GT. Parts are of junk box type...June '42.....25¢

R-303 "Veep" One-Tube a.c.-d.c. Emergency Pocket Receiver. This tiny broadcast receiver employs one 117L7-GT tube and operates on any 110-volt line. It is housed in a small cigar box..May'42.25¢

R-302 Two and One-Half Meter Emergency "Walkie Talkie". Classroom plans for students and instructors, for a compact portable local range transceiver; also for use by licensed amateur radio operators in emergency defense communications when, and if, such home guard operation is authorized. Tubes: 1- 6G6-G; 1- HY 615. .....Apr. 1942.....25¢

R-300 "Black Light" Photo-Cell Relay Burglar Alarm System. Operates an alarm bell on an invisible "Black Light" beam at distances up to 50 feet. Tube: 1- 117L7-GT.....Feb. 1942.....25¢

*R-299 FM Adapter for your Radio. Enables anyone to tune in the new frequency modulation (FM) programs through your broadcast receiver. Tubes: 3- 6AC7; 2- 6SJ7; 1- 6SA7; 1- 6H6; 1- 5Y3-G; 1- VR-150/30 (voltage regulator tube)....Feb. 1942.....25¢

R-298 Miniature-Tube Battery Receiver and Phono Oscillator. An inexpensive breadboard layout easily assembled from junk box parts. Tubes: 2- 1S4; 1- 1S5.....Jan. 1942.....25¢

* Temporarily discontinued

*R-297 Miniature Portable "Microtube" Three. One of the smallest three tube broadcast receivers ever designed. Operates on flashlight cell and a tiny B-battery. Tubes: 2- M74; 1- M54 (Microtubes) (Locating Hidden Stations.).....Dec. 1941.....25¢

R-296 "DX" Economy Special One-Tube a.c.-d.c. Receiver. Simple low-cost broadcast receiver for headphone use. Tube: 1- 117N7-GT .....Nov. 1941.....25¢

R-295 Portable 10-watt Sound System for Battery or A.C. Operation. P.A. amplifier works on a 6-volt storage battery or 110-volt 60-cycle power line. Tubes: 1- 6N7; 1- 6J7; 2- 6V6;1- 5Z3 .....Oct. 1941.....25¢

R-294 Improved A.C.-D.C. Little Giant "Pup". A 3-tube T.R.F. broadcast receiver. Tubes: 1- 70L7-GT; 1- 12K7-GT; 1- 12J7-GT .....Sept. 1941.....25¢

R-293 Portable Home Recorder and Player Unit Works with Receiver. Make your own recordings and play them back through any good 5 or 6-tube set; small midget receivers are not suitable. Designed around a $17.00 Russell recording unit. Has built-in pre-amplifier. Tubes: 1- 12SJ7; 1- 35Z5-GT.....Aug. 1941.....25¢

R-292 Four-Purpose Amplifier Unit for Experimenters. A simple low-cost 1-tube self-powered audio amplifier. Boosts volume of any 1-tube receiver; microphone input for home broadcasting; or, call system to other rooms. Has phono input for a record player; and also acts as B-eliminator to supply about 80 volts for small sets. Tube: 1- 117N7-GT.....July 1941.....25¢

*R-291 Portable Twenty-Watt P.A. Amplifier. A highly efficient modern public-address amplifier. Housed in a single sturdy 3-unit case, two of which serve as baffles for 12-in. speakers. Tubes: 1- 5Z3; 2- 6J7; 2- 6SC7; 2- 6L6-G.....June 1941.....25¢

R-290 High-Fidelity Record Player. For direct connection to any a.c. operated radio receiver by means of a standard tube-socket phono adapter plug, or to phono pickup jacks...May '41....25¢

R-289 Miniature-Tube "DX" Set Works on Flashlight Cells. An ideal "first set" for radio builders; two low cost units; use two type 1S4 miniature low-drain tubes; for phones or speaker. .....April 1941.....25¢

R-287 General-Purpose T.R.F. Tuner Unit. Designed for high quality reception of local broadcasts; may be used with any radio set amplifier or P.A. system. Tubes: 2- 6K7-G; 1- 6J7;1- 80 .....Feb. 1941.....25¢

R-286 Two-tube A.C.-D.C. All-Wave Receiver. This all-wave set employs standard plug-in coils covering from 9½ to 550 meters; uses one 6SJ7-GT and one 32L7-GT tube; real DX getter...Jan.'41....25¢

R-285 Low-Cost Receiver and Phono Amplifier. A simple A.C.-D.C. receiver and also a simple phono amplifier for a record player. Tubes: 1- 25B8-GT; 1- 70L7-GT.....Dec. 1940.....25¢

R-284 Miniature Tubes in Wearable Hearing Aid. Compact hearing-aid amplifier; three tiny radio tubes in a small case worn with neck ribbon. Tubes: 2- HY115; 1- HY125.....Nov. 1940.....25¢

*R-282 Low-Cost Pack Set for Camp or Boat. Self-contained, self-powered "over-the-shoulder" portable battery-operated receiver built into a revamped 49¢ over-night bag. Tubes: 1- 1D8-GT; 1- 1N5-GT; 1- 1A7-GT.....Sept. 1940.....25¢

R-281 Capacity-Operated Vacuum-Tube Switch. Short alarm wire operates relay to ring alarm bells, light lights, etc. at approach of person or passing object. Tubes: 1- 77; 1- 43...Aug.'40.....25¢

R-280 Beginner's One-Tuber for Short Waves. Uses type 1D8-GT tube, one 45-volt B-battery and two 1½-volt flashlight A-batteries; covers 9½ to 217 meters.....July 1940.....25¢

R-279 P.M. Portable Battery-Operated Vacation Receiver. Self-contained in wood carrying case; easily portable. Tubes: 1- 1A7-GT; 1- 1N5-G; 1- 1H5-G; 1- 1T5-GT.....June 1940.....25¢

*R-277 Loop-Operated Battery Portable. Easily portable broadcast receiver; employs four 1.4-volt tubes. Tubes: 1- 1A7-GT; 1- 1N5-GT; 1- 1H5-GT; 1- 1Q5-GT.....April 1940.....25¢

R-275 Two-Band Flashlight-Battery Receiver. Beginner's set covers the broadcast band, also extended short-wave band. Tubes: 2- 49 .....Feb. 1940.....25¢

R-272 Portable Low-Cost Sound System. Sound system for public address two 12-inch P.M. speakers; 10-watts (with turntable) Tubes: 2- 2A6; 4- 56; 2- 45; 1- 80.....Nov.& Dec. '39.....25¢

R-271 Beginner's One-Tube A.C.-D.C. Loudspeaker Set. Simple All-electric set uses a fixed crystal detector. Tube: 1- 25A7-GT .....Oct. 1939.....25¢

R-270 Two-tube "Phanthom" Record Player. Plays phonograph records through your radio receiver without wired connections. Tubes: (Loctal type) 1- 35A5; 1- 35Z3.....Sept. 1939.....25¢

R-267 On-a-chair Cabinet for your Midget Receiver. Cabinet hangs on arm of an easy chair.....May 1939.....25¢

* Temporarily discontinued

R-266 Low-Cost Three-Unit Broadcast Receiver for Beginners. Inexpensive and easy to build; designed for students and experimenters; employs 1.4-volt tubes; dry cell battery operated. Tubes: 2- 1H5-G; 1- 1N5-G.....April-May '39.....25¢

*R-265 1939 Little Giant Portable T.R.F. Phono-Radio. This is a combination electric phonograph and 4-tube a.c. receiver. Tubes: 1- 6C6; 1- 6V6-G; 1- 6D6; 1- 80.....Mar. 1939.....25¢

R-264 P.M. Simplified Tube Tester; tests over 120 different types of modern radio tubes; a sensitive short-tester, also checks leakage between cathode and filament, low-cost, easy to build. .....Feb. 1939.....25¢

R-263 Photo-Cell Relay for 110-volts A.C. or D.C. Permits control of lights, alarm bells, counters and other electrically operated equipment. Tubes: 1- 25A7-G; 1 Photo-cell N-2760 (or similar) .....Jan. 1939.....25¢

R-261 see note Compact 10 & 20-meter 400-watt Phone Transmitter; complete in sectional relay rack; not for beginners. Tubes: 1- 6F6; 1- 807; 2- 6J7; 2- 6C5; 2- T55; 2- 203-Z; 2- 866 Jr.; 2- 866; 1- RK-20; 2- 6A3.....Dec. 1938.....25¢

R-259 All-Purpose Power Supply; three simple units combine to meet all requirements for experimenters; operates on 6-volt storage battery or 110-volt a.c. line. Tubes: 1- 80; 1- 84...Nov.'38..25¢

*R-257 Battery-Operated Electric Fence Controller. An effective method of keeping livestock within bounds; Four 1½ volt dry cells operate the device. Will not work on power lines.Sept.'38.25¢

R-256 Three Progressive Low-Cost Receivers for Beginners. Starting with a crystal set, the builder can add a few parts and have a 1-tube battery-operated broadcast receiver or a good short-wave set. Tube: 1- RK-43 Note- Type used in "weather balloons" .....Aug.& Sept. 1938....25¢

R-255 How to build an Armchair Cabinet for a 4 or 5-tube Receiver. Designed to hold the receiver chassis of any small set. .....July 1938.....25¢

R-254 Three-Tube Radio Direction Finder; a good 3-tube battery-operated loop receiver designed for radio direction finding on land or water; also receives broadcasting stations for entertainment Uses 1-type 6J7 tube, and 2-type 6F5 tubes..June '38.....25¢

R-252 One-Tube DX Short-Wave Flashlight-Battery Receiver; similar to R-227 broadcast receiver, but is for short waves only. A 1-tube amplifier stage is included; hand wound coils. Tube: 1- 49.....April 1938.....25¢

R-248 see note How to Build a 5-Meter M.O.P.A. Transmitter; Uses one RK-34 tube as master oscillator and two type-46 tubes in power amplifier; carrier output about 35 watts...Jan. 1938.....25¢

R-245 Two-Tube Portable Battery Receiver; A compact broadcast set to take to ball games or mount on bicycles. Tubes: 2- 30 .....Dec. 1937.....25¢

R-243 How to Build an Eight-Tube Radio Balance; A highly efficient portable metal-locating device. Tubes: 2- 31; 6- 30 (or 8 type-30 tubes).....Oct.& Nov. 1937.....25¢

R-227 (New) Audio Amplifier added to One-Tube Flashlight Battery Set; the additional amplifier tube added in the October 1937 issue now makes this popular receiver a two-tuber. Tube: 1- 49. .....October 1937.....25¢

R-239 Portable Amplifier Built into Speaker Case; amplifier for public address; also a good amplifier for stringed instruments. Tubes: 1- 6J7; 1- 6N7; 2- 6N6-MG; 1- 83.....June 1937.....25¢

R-237 see note 6L6 "Beam" tube Crystal-controlled 40-meter C.W. Transmitter for beginners; costs no more than the average 2 or 3-tube short-wave receiver; has range of about 500 miles; tri-tet oscillator uses 80-meter crystal and doubles to 40 in plate circuit; operates on any 400-volt, 100-MA. power supply. Tube: 1- 6L6. .....April 1937.....25¢

R-236 One-Tube 6N7 Band-Spread DX Short-Wave Receiver for Beginners; hand-wound plug-in coils; tunes from 20 to 160 meters, also the 19 and 31-meter bands; works on 6-volt battery (or trans.) and B-batteries. Tube: 1- 6N7.....April 1937.....25¢

R-231 see note How to Build a 150-watt All-Band Transmitter; rack and panel assembly for CW or phone. This construction article is not for beginners. Tubes: 3- RK-20; 2- 866; 2- RK-31..Nov.'36.....25¢

R-225 All-Metal Two-Tuber for Short-Waves; a good inexpensive short-wave set using 6J7 and 6C5 tubes; four hand-wound plug-in coils .....July 1936.....25¢

R-218 Two Low-Cost Crystal Receivers for Beginners; easy to build, inexpensive parts.....Jan. 1936.....25¢

R-216 see note 3-Band 802 CW Transmitter; crystal-controlled unit with power supply; no neutralizing required; uses four 802's and one 83. .....Nov. 1935.....25¢

* Temporarily discontinued

R-188 Several Selective Crystal Receivers at low cost .....Apr. 1933.....25¢

R-322 1944 Little Giant TRF A.C.-D.C. Receiver; a simple highly efficient student model built from parts salvaged from old radios. Hand-wound coils. Tubes: 1- 6K7-G (or 6K7, or GT); 1- 6J7-G (or 6J7, or GT); 1- 38; 1- 1-V half-wave rectifier (or a 37 or 76 as optional rectifier, see Fig. 1-A)....Mar. 1944.....25¢

R-327 Dual Phono Unit Has Self-Contained Amplifier and Electronic Controls; for fading records and microphone in and out for musical background and sound effect records for home movies. Also makes an excellent portable public address amplifier for schools and other group entertainment uses...Aug. & Sept. 1944.....25¢

NOTE- As no parts for R-216, R-231, R-237, R-248 and R-261 are available, and no amateur radio transmitting is permitted at the present time, the lists and blueprints for these large transmitters are only supplied for classroom use by students and instructors.

Only a limited number of new radio blueprints will be issued for the duration of the war because of paper shortage. However, the ones that now appear in this list will be carried in stock at the usual price of 25¢ each. Material lists will always be available without charge for any of these radio construction articles, and also for all new student units in coming issues when so stated in the article text.

Material lists, but no blueprints, are available for the following recent construction articles. (See back issues for circuit diagrams)

R-314 Universal Testing Bridge Measures Unmarked Parts; measures resistors, condensers and chokes without the use of a meter. Tubes: 1- 6A6; 1- 56.....April 1943

R-315 Simple "Breadboard" A.C.-D.C. Call System; useful in schools, homes and workshops; may be used as a call system or phono amplifier. Tubes: 1- 32L7-GT; 1- 6C5-GT.....May 1943

R-316 "Pop Corn Can" Signal Generator for Home Set Servicing; a.c.-d.c. oscillator provides signals for calibrating receivers. Tubes: 1- 7A7LM loctal (interchangeable with a 7A7); 1- 6C5-GT or GT/G .....July 1943

R-317 Emergency B-power Unit for Small Receivers; hum-free a.c.-d.c. power unit for operating battery portables on power line. Tubes: 2- 37. Note- Other tubes can be substituted for the 37's such as 6C6; 6D6; 76; 77 or 78 with suitable sockets....Aug. 1943

R-318 General-Purpose Amplifier and Hearing-Aid Unit; parts obtained from a discarded midget receiver; for civilian aircraft spotters; also a hearing aid for the deaf. Tubes: 2- 6SJ7; 1- 37 .....Sept. 1943

R-319 Two-Tube Six-Volt "Blackout" Emergency Set; emergency broadcast receiver operates on a 6-volt auto storage battery, or 4 No. 6 dry cells. Tubes: 2- 6C6-G.....Nov. 1943

R-320 "Big Town" Bike Receiver; a compact fixed-crystal receiver, for a bicycle, receives local broadcasting stations....Dec. 1943

R-321 Two Crystal Receivers Made From Scrap Materials; for beginning students and experimenters; homemade parts.....Jan. 1944

R-323 Portable Phono-Attachment and "Mystery" Player; operates through any radio receiver or amplifier, either direct or by means of a built-in "Wireless" phono oscillator; Tubes: 1- 6A7; 1- 6C6 .....April 1944

R-324 "Junk Box" Two-Way Electronic Phone System; provides 2-way communication between house, barn or garage; has separate calling system; amplifier works on 110-v. line. Tubes: 1- 37 1- 38.....May 1944

R-325 "Wireless" Code Oscillator Operates Through Receiver; serves large groups without headphones. Tubes: 1- 6C5; 2- 6J7-GT .....June 1944

R-326 Pocket Portable Has Built-in Loop Antenna; assembled in a cigar box; fits the pocket. Operates on small flashlight batteries. Tube: 1- 1S4.....July 1944

R-328 Desk Lamp "DX-er" for Boy's Room. A simple two-tube a.c.-d.c. broadcast receiver using two type-37 tubes and a 40-watt lamp. Built into a card file box; lamp and shade are mounted on case. .....Oct. 1944

R-329 Short-Wave "J-B" Three Uses Old Battery Tubes. Tunes from 10 to 160 meters. Either type-30, 199 or 201-A tubes used. Nov. 1944

F. L. Sutton

RADIO and ELECTRONICS EDITOR

ORIGINAL MATERIAL LIST FOR
POPULAR MECHANICS MAGAZINE
BEGINNER'S "SPECIAL" ONE-TUBER FLASHLIGHT BATTERY SET
******** ("V" SERIES RECEIVER NO. 1) ********

This is No. 1 of a series of extremely simple "V" sets for students and experimenters. This set appeared in the July 1942 issue of Popular Mechanics Magazine. It is a complete and thoroughly tested unit made-to-order for the beginner and can be assembled from odds and ends of parts commonly found in the average student and radio experimenter's junk box, or salvaged parts from discarded sets. Although the "V" sets to follow employ practically all the same parts, with inexpensive additions, each set is an individual unit and entirely different. Simple hand-wound coils, breadboard construction and parts of non-critical values give the builder an opportunity to try out a variety of circuits. Now is the time for the student and experimenter to save old wire, coil forms, condensers and resistors to build up a junk box that will provide a means for assembling useful units for study and practical radio experimenting. This No. 1 set employs a type 1Q5-GT tube, and the A and B-battery supply is obtained by means of 6 ordinary flashlight cells. Set No. 2 in the "V" series will appear in the September issue. In the meantime an extremely simple B-battery eliminator will be described for construction in the August issue. This power unit will be suitable for the larger sets. An enlarged blueprint of all layout and wiring diagrams for this No. 1 Beginner's "Special" One-Tuber, complete in every detail, is available from Popular Mechanics Magazine Radio Department, 200 E. Ontario Street, Chicago, Illinois, for 25¢ to cover cost & mailing.....Specify Blueprint.....R-305

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1- Wood baseboard 3/4 x 7 x 9½ in. (clear pine wood well sanded)
1- Strip of hard pressed wood 1/8 x 1 1/8 x 2½ in.
1- .000365 mfd. (or 365 mmfd.) variable condenser (C1)
NOTE- the rotor plate connection is common with the condenser frame; the insulated stator (or stationary) plate connections are taken from both sides of this condenser. If your condenser has only one stator terminal, run both stator leads to the same terminal lug.
2- .00025 mfd. mica fixed condensers (C2 and C3)
1- Hand-wound coil,-see Fig. 1 for details. This coil is wound on a card-board tube removed from an old No. 950 Eveready flashlight cell.
1- 2-megohm 1/2 watt fixed carbon resistor (R1) Red-Black-Green
1- 500,000 ohm variable resistor, with switch (R2)
1- Knob for R2; and 1 pointer knob for C1
1- Octal socket (Amphenol replacement type-RS or any similar 8 octal with an adapter plate that can be mounted on bushings)
2- 1-in. bushings (cut from any kind of metal tubing available)
2- 1½ in. wood screws; 11- 1/2 in. wood screws
1- 8-32 machine screw 3/4 in. long (drill and countersink a hole for this screw on the underside of the base; check correct position for the mounting screw so that the condenser will be mounted flush with the front edge of the baseboard.
8- Fahnestock clips; 1- Type 1Q5-GT tube
10-large round hole soldering lugs
1 -small coil of hookup wire with push-back insulation. Any flexible insulated wire about size No.18 or 20 can be used.
1- Small spool of No. 30 enameled wire. NOTE- this same size wire will be used later for winding a number of plug-in coils. It is a common size and type of wire that may be salvaged from old coils.
6- 1½ volt flashlight cells (Eveready No.950 cells were used)

NOTE- when winding the coil, the first step is to punch two holes in the cardboard tube with a needle, about 1/16 in. from the end of the tubing and about 1/4 in. apart. Thread the No. 30 enameled wire through the holes leaving a lead about 5 in. long for connecting, anchor the wire and start the 31-turn antenna winding (L3) rotating the form with one hand and guiding the wire with the other. Punch 2 more holes at the end of the 31st. turn and clip the wire, leaving a 5-in. lead and anchoring the wire as at the start. Now in exactly the same manner, start the 93-turn tuning coil (L1) 1/8 of an inch from the antenna coil. The 53-turn "tickler" coil(L2) completes the coil winding job. Mount the coil on the baseboard with china cement in the position shown, and solder all connections carefully with rosin-core wire solder. Use a good pair of 2,000 ohm phones, a 50 or 75-ft. outdoor antenna and a ground on a cold water pipe. To tune the set, turn the variable condenser until a whistle is heard, then back off the variable (R1) until whistle stops and station comes in clear.

If there are any points not clear to the builder, write to the Radio Editor, Popular Mechanics Magazine, 200 E. Ontario St., Chicago, Illinois, for further information. There is no charge for this service.

ORIGINAL MATERIAL LIST FOR
POPULAR MECHANICS MAGAZINE
EXPERIMENTER'S "SPECIAL" 5-BAND BEAM-POWER TWO-TUBER

This No.2 in the series of "V" sets for students and experimenters appeared in the September 1942 issue of Popular Mechanics Magazine. Although this 2-tube receiver utilizes parts that were used in the one-tube No.1 set R-305 that appeared in the July 1942 issue, it is a complete and entirely different set. This 2-tuber uses a 1Q5-GT as a detector, and a second 1Q5-GT serves as an audio amplifier stage, boosting the output volume on broadcast stations and distant short-wave stations. If you have built the one-tube set R-305, it will not be necessary to dismount the volume control, tube socket, Fahnestock clips, resistor (R1) and fixed condenser (C2). However, all other parts should be removed. The frame and shaft of variable condenser (C1) must not touch the metal panel, make the hole in the panel large enough to clear the shaft. Five-band operation is obtained by the use of 5 hand-wound plug-in coils, and a simple switching arrangement. An enlarged blueprint of all layout and wiring diagrams for this 2-tube receiver, complete in every detail, is available from Popular Mechanics Magazine, Radio Department, 200 E. Ontario St., Chicago, Illinois, for 25¢ to cover cost and mailing.....Specify Blueprint R-307

******COMPLETE LIST OF MATERIALS FOR R-307******

1- Wood baseboard ¾ by 7 by 9½ in. (clear pine wood well sanded)
1- Strip of hard pressed wood, and a sheet metal panel as detailed in Fig.1.Note-metal panel may be galvanized iron or sim. scrap metal.
1- .000365 mfd. (or 365 mmfd.)variable condenser (C1) Note-the rotor plate connection is common with the condenser frame; the insulated stator (stationary) plate connections may be taken from both sides of this condenser as shown. If your condenser has only one stator (S) run all stator leads to the same terminal lug.
2- Standard rim 4-prong plug-in coil forms; 3 bases from old 4-prong tubes
1- Small spool of No. 30 enameled wire.Note-No.28 or No.32 can be used plain enameled wire of these sizes may be salvaged from old radio coils.
2- Octal sockets and one 4-prong socket.Note-these may be Amphenol replacement type-RS or any wafer or adapter plate type that can be mounted on bushings. Six mounting bushings 1-in.long cut from any kind of metal tubing available, or, fiber tubing may be used.
1- Audio transformer 3-1 or 3½ -1 ratio (any make-not critical)
1- 2½ mh. radio frequency choke (R.F.C.)
1- 500,000 ohm,audio-volume-control type var. resistor(R2) (with switch)
1- 3-in. dial 100 to 0; 1 toggle switch(No.2); 9 Fahnestock clips;1 knob.
1- 2 megohm resistor,1/2 watt carbon type (R1) red-black-green
1- Mica, or tubular paper type, .00025 mfd. fixed condenser (C2)
2- " " " " " .0002 mfd.fixed condensers(C3 and C5)
1- 3-30 mmfd. screw-type trimmer condenser(C4)
1- .25 mfd. paper condenser 200 volts, or more. Note-.5 or 1 mfd. may be used if you have them on hand.
2- type 1Q5-GT tubes; 6 wood screws 1½in.long; 17 wood screws 1/2 in. long; 1 small coil of No. 18 or 20 hook-up wire with push-back insulation, or any similar salvaged hook-up wire: 13 soldering lugs.
4- 1½ volt flashlight cells for C-bat.;try voltages between 3 and 6 volts for best results. 1 No.6 dry cell; 1-B-batt. 45 volt with a 22½ volt tap. Note-You can use the simple B-eliminator described in the August 1942 issue, instead of the B-battery, if you wish to do so. If B-eliminator is used, keep it several feet away from the set and do not use a direct ground on the set. If it is necessary to use a ground on any set with which the B-eliminator is used, a .1mfd. 400-volt tubular-type paper condenser must be connected in series with the set ground lead. With the B-eliminator there is some tunable hum on the final 1/3 range of the smallest coil. This hum may be eliminated by moving the set away from nearby power outlets, or changing the length of the antenna slightly.

Use rosin core wire solder for all connections. Antenna should be at least 50 ft. long. Use a good pair of 2,000 ohm headphones. To tune the broadcast band: insert coil No.1 and see that switch No.2 is closed. Turn tuning condenser (C1) until whistle is heard, then back off volume control (R2) until the whistle stops and the station comes in clear. For short waves open switch No.2 and use coil for the band desired. The set is most sensitive at point just where whistle stops and the station comes in. Adjust antenna trimmer condenser C4 for maximum results on each band. When the set is not in use, turn off switch No. 1 on the volume control.

If there are any points not clear to the builder, write to the Radio Editor, Popular Mechanics Magazine, 200 E. Ontario St., Chicago, Ill., for further information. There is no charge for this service.

*** RADIO STUDENTS ***
SAVE OLD COILS AND PARTS FROM DISCARDED RECEIVERS
NEW PARTS ARE NOT NECESSARY IN OUR STUDENT UNITS

ORIGINAL MATERIAL LIST for
POPULAR MECHANICS MAGAZINE
ALL-PURPOSE POWER SUPPLY for 110-VOLT A.C. or BATTERY OPERATION

Now you can build a truly universal power supply to serve your battery-operated receiver, a.c. set, amplifier or transmitter. These three simple and inexpensive units were described in the November 1938 issue of Popular Mechanics Magazine. They are not difficult to build, and combine to meet practically all requirements for the up-to-date experimenter, set builder and amateur. Unit No. 1 is a universal filter and voltage divider. It is provided with an octal male plug of the chassis-mounting type, and the connections must be made just as shown so that the prongs will engage the proper outlet socket connections in each of the power units when they are plugged in for either 110-volt a.c. or 6-volt storage-battery operation. The a.c. unit, No. 2, operates on 110-volts a.c. 50 or 60-cycles. It converts the power line supply to high d.c. voltage and also steps down the source of power to 6 volts for tube filament requirements. Unit No. 3 provides the same voltages from a 6-volt storage battery. The average current drain on the storage battery for the "B" supply is only 1 1/4 amp. In the diagram of the filter and voltage-divider, Fig. 1, it will be noted that the octal plug points 2 and 7 are filament leads; positive "B" connection goes to point 5; negative "B" and ground run to No. 4 prong. Any positive "B" voltage from 22 1/2 to 300 volts may be obtained in steps from 5 handy binding posts. Up to 50 m.a. can be taken from the 225 to 300-volt post, and up to 20 m.a. from any of the others. All three units are assembled on metal bases of exactly the same size. Drilling details are given for the filter and voltage-divider unit No. 1. Holes for the other units are not critical as to position, and their locations are clearly indicated in the various photos. An enlarged blueprint of the layout and wiring diagrams, complete in every detail, is available from Popular Mechanics Radio Department, 200 E. Ontario Street, Chicago, Ill., for 25¢ to cover cost and mailing.....Specify Blueprint R-259.

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3- Metal bases 8 by 6 by 2 in. These can be hand made or purchased formed and drilled if desired.

UNIT NO. 1
Filter and Voltage Divider

1- Bakelite strip 3/16 by 1 by 5 1/2 in.
7- Eby black binding posts
1- 30-henry, 50 ma. filter choke
1- Dual 8 mfd. electrolytic condenser; 550-volt type with 4 leads in cylindrical metal can. Knight type A-3858 or similar
1- Amphenol octal male plug for chassis mounting
2- 12,500-ohm 10-watt resistors; Knight, Ohmite, IRC or similar
2- 16,000-ohm " " " " " " " "

(Over)

UNIT NO. 2
110-Volt A.C. Power Unit

1- Fuse receptacle (molded bakelite fuse holder)
1- 1-amp. (Littelfuse) to fit holder
1- 7-ft. cord and a.c. plug
1- "Off-On" toggle switch
1- Amphenol octal socket
1- Amphenol four-prong socket
1- Type 80 rectifier tube;RCA or Raytheon
1- Power transformer; 110-volt a.c. primary; Secondary 650 volts center-tapped: also 5-volt 2 amp. winding and a 6.3-volt winding at 2 amp. This transformer is a helf-shell type
1- .1 mfd. 600-volt tubular-type fixed condenser.

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UNIT NO. 3
6-Volt Storage Battery Unit

1- 7-ft. battery cable (2 conductors)
2- Spring clips, for battery posts
1- Amphenol male 4-prong plug
2- " 4-prong sockets
1- " 5-prong socket
1- " octal (8-prong) socket
1- Vibrator transformer; Knight or Stancor type P-406 (secondary is designed for d.c. output of 275 volts at 40 ma.
1- Vibrator unit, 4-prong plug-in type. A Philco replacement unit was used in model; any similar non-synchronous type with a 4-prong base having the same internal connections may be used.
1- Type 84 tube; RCA or Raytheon
1- "On-Off" toggle switch
1- 24 mh. R.F. choke, with mounting bracket
1- Hand-wound R.F. Choke, made by winding 25 turns of No. 14 enameled wire on a form 1/2 in. in diameter. The coil is close-wound and the form is then withdrawn. Leave sufficient wire at the ends for terminals as this r.f. coil is self-supporting.
2- .5 mfd. 200-volt tubular-type fixed condensers
2- .02 mfd. 600-volt " " " "
2- .1 mfd. " " " " " "

The filter and voltage divider unit is plugged into either of the power units, depending upon the source of power to be used. The voltage-tap values are approximate and should be used as called for, within the ranges shown in diagram Fig. 1. These units are expecially useful to the experimenter who wishes to convert his battery radio to single battery or power use, thus doing away with B-batteries.

If there are any points not clear to the builder, write to the Radio Editor, Popular Mechanics Magazine, 200 E. Ontario St.,Chicago, Ill., for further information. There is no charge for this service.

CHEST MUSH MOUNTING TRANSFORMERS FIT THE PHYSICAL AND ELECTRICAL REQUIREMENTS OF THE MAJORITY OF RECEIVERS. ANY COMBINATION OF TUBES MAY BE USED PROVIDING THE CURRENT OF THE WINDING IS NOT EXCEEDED.

TYPE NO.	PRI.	H.V.W.D.	FIL. NO.1	FIL.NO.2	FIL. NO.3	MTG.CTRS.
NO.	LOC		1-3	4-9-10	11-2	
6411	115V	650 - 40	5V - 3A	6.3V - 2A		2x3-1/2
6413	115V	650 - 45	5V - 3A	6.3V - 2A		2x2-1/2
6414	115V	675 - 60	5V - 3A	6.3V - 2A		2x3-1/2
6415	115V	700 - 70	5V - 3A	6.3V - 3.5A		2-1/2 x 3-1/8
6416	115V	700 - 100	5V - 3A	6.3V - 4A		2-1/2 x 3-1/8
6417	115V	650 - 40	5V - 2A	2.5V - 3.75A		2x2-1/2
6419	115V	650 - 45	5V - 2A	2.5V - 3A		2 x 2-1/2
6420	115V	675 - 50	5V - 2A	2.5V - 7.5A		2 x 2-1/2
6421	115V	700 - 70	5V - 3A	2.5V - 3.5A	2.5V - 7.5A	2-1/2 x 3-1/8
6424	115V	700 - 90	5V - 3A	2.5V - 3.5A	2.5V -10.5A	2-3/4 x 3-7/16

choke
#62-C01 #6201

25 Henries 60 M.A. 200 ohms

Ltg. Ctr's. 2' 13/16"